AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims the application.

LISTING OF CLAIMS

Claims 1 –9 (canceled)

Claim 10. (currently amended)

A method, using a computer system, for physically laying out a microfluidic circuit comprising a plurality of microfluidic components, said method comprising:

- selecting a template;
- placing a first component of said plurality of microfluidic components on said template, wherein said plurality of microfluidic components each have an associated property;
- placing a second component of said plurality of microfluidic components on said template; and
- connecting said first component to said second component
- wherein said associated property has at least one of physical scaling, physical property, layer assignment, and functional definition~~The method of claim 9 wherein~~ and said physical property includes a physical dimension having depth information.

Claim 11. (currently amended)

The method of claim [[9]]10 wherein said physical property includes an element attribute.

Claim 12. (currently amended)

A method, using a computer system, for physically laying out a microfluidic circuit comprising a plurality of microfluidic components, said method comprising:

- selecting a template;
- placing a first component of said plurality of microfluidic components on said template, wherein said plurality of microfluidic components each have an associated property;
- placing a second component of said plurality of microfluidic components on said template; and
- connecting said first component to said second component

wherein said associated property has at least one of physical scaling, physical property, layer assignment, and functional definition. ~~The method of claim 8~~ wherein said first component comprises an elastomeric structure.

Claim 13. (currently amended)

The method of claim [[8]]12 wherein said elastomeric structure is formed by bonding together a plurality of layers of elastomer.

Claim 14. (currently amended)

The method of claim [[8]]12 wherein said elastomeric structure is formed in part by depositing a photoresist layer on top of an elastomeric layer.

Claim 15. (currently amended)

The method of claim [[8]]12 wherein each component of said plurality of components includes a representative symbol.

Claim 16. (currently amended)

The method of claim [[8]]12 wherein said first component comprises a control channel which moves an associated rigid silicon material, and a fluid channel formed from an elastomeric material.

Claim 17. (currently amended)

The method of claim [[8]]12 wherein said first component functions as a NAND gate.

Claim 18. (currently amended)

The method of claim [[8]]12 wherein said plurality of microfluidic components include channels, pumps, valves, chambers, cell sorters, DNA fingerprint macros, multiplexers, bridges, pressure oscillators, and layer interconnects.

Claim 19. (currently amended)

The method of claim [[8]]12 wherein said plurality of microfluidic components comprise a structure made from a material selected from the group consisting of a flexible material, a rigid material, or a mixture of rigid and flexible materials.

Claim 20. (currently amended)

The method of claim [[8]]12 wherein said rigid material is a silicon based material.

Claim 21. (currently amended)

The method of claim [[8]]12 wherein said flexible material is an elastomer based material.

Claim 22. (currently amended)

The method of claim [[8]]12 wherein said first component comprises a first control channel and a first fluid channel, said second component comprises a second control channel and a second fluid channel, and said connecting comprises connecting said first fluid channel to said second fluid channel.

Claim 23. (original) The method of claim 22 wherein when said first component is on a first fluid layer and said second component is on a second fluid layer, said first fluid channel being connected to said second fluid channel by a via.

Claim 24. (original) The method of claim 22 wherein said first control channel is on a control layer and said first fluid channel is on a fluid layer.

Claim 25. (original) The method of claim 24 wherein said control layer is separate from said fluid layer.

Claim 26. (original) The method of claim 22 wherein said first fluid channel is connected to said second fluid channel by a third fluid channel and wherein when said first control channel is connected to a third control channel that crosses said third fluid channel, said third control channel uses an interconnect bridge to cross said third fluid channel.

Claim 27. (original) The method of claim 26 wherein said third fluid channel is reduced in width at and near where said third control channel crosses said third fluid channel.

Claim 28. (currently amended)

The method of claim [[8]]12 wherein said first component comprises a first control channel and a first fluid channel, said second component comprises a second control channel and a second fluid channel, and said connecting comprises connecting said first control channel to said second control channel.

Claim 29. (currently amended)

The method of claim [[8]]12 wherein said connecting comprises auto-routing.

Claim 30. (currently amended)

The method of claim [[8]]12 wherein said connecting comprises routing.

Claim 31. (currently amended)

The method of claim [[8]]12 wherein said connecting comprises a design rule check.

Claim 32. (original) A microfluidic circuit physical layout method, using a computer, comprising:

- selecting a template comprising an I/O port;
- placing a microfluidic component on said template, wherein said microfluidic component comprises a component control channel and a component fluid channel; and
- connecting said component control channel to said I/O port.

Claim 33. (original) The method of claim 32 wherein said microfluidic component includes an elastomeric structure.

Claim 34. (original) The method of claim 32 wherein said connecting includes using a control channel to connect said component control channel to said I/O port.

Claim 35. (original) The method of claim 32 further comprising:

- placing another microfluidic component on said template; and
- connecting said component fluid channel of said microfluidic component to another component fluid channel of said another microfluidic component.

Claim 36. (original) A method for physical layout of a microfluidic system, said microfluidic system comprising a plurality of microfluidic components, said method comprising:

- placing a component of said plurality of microfluidic components on a first layer of a plurality of layers, said component comprising a first fluid channel and a first control channel;
- placing a second fluid channel on a second layer of said plurality of layers; and
- connecting said first fluid channel to said second fluid channel using a via.

Claim 37. (original) A method for physical layout of a microfluidic system using a computer aided design tool, said microfluidic system comprising a plurality of microfluidic components, said method comprising:

- selecting a template, comprising a plurality of layers;
- placing a first symbol representing a first component of said plurality of microfluidic components, said first symbol comprising a first fluid channel symbol and a first control channel symbol, said first control channel symbol on a different layer of said plurality of layers than said first fluid channel symbol;
- placing a second symbol representing a second component of said plurality of microfluidic components, said second symbol comprising a second fluid channel symbol; and
- connecting said first fluid channel symbol to said second fluid channel symbol.

Claim 38. (original) The method of claim 37 wherein said template comprises an I/O port and said first symbol comprises a first control channel symbol, said method further comprising connecting said first control channel symbol to said I/O port.

Claim 39. (original) The method of claim 37 wherein said plurality of microfluidic components are selected from the group consisting of logic gates, channels, pumps, valves, oscillators, chambers, and layer interconnects.

Claim 40. (original) The method of claim 37 wherein symbols are connected according to preset design rules.

Claim 41. (original) The method of claim 37 wherein said plurality of microfluidic components are assigned physical scaling.

Claim 42. (original) The method of claim 37 wherein said plurality of microfluidic components are assigned physical properties.

Claim 43. (original) The method of claim 37 wherein said first component is an active fluidic component.

Claim 44. (original) The method of claim 37 wherein symbols of components of said plurality of microfluidic components are placed automatically based on preset design rule constraints.

Claim 45. (original) The method of claim 37 wherein symbols of components of said plurality of microfluidic components are placed interactively.

Claim 46. (original) The method of claim 37 wherein symbols of components of said plurality of microfluidic components are placed manually subject to predetermined design rule checks.

Claim 47. (original) The method of claim 46 wherein said predetermined design rule checks include one or more of the checks on I/O placement, channel size mismatch, dangling channels, overlapping components and channels, and channel spacing.

Claim 48. (original)The method of claim 37 wherein the components are placed based on mechanical properties.

Claim 49. (original) The method of claim 37 wherein said first symbol is connected to said second symbol automatically using an auto-routing routine.

Claim 50. (original) The method of claim 37 wherein said first symbol is routed to said second symbol interactively.

Claim 51. (original) The method of claim 37 wherein said first symbol is connected to said second symbol manually using a computer display.

Claims 52 - 76. (canceled)

Claim 77. (currently amended)

A computer program product stored in a computer readable medium for physically laying-out a microfluidic circuit comprising a plurality of microfluidic components, said computer program product comprising:

- code for selecting a template; code for placing a first component of said plurality of microfluidic components on said template, wherein said plurality of microfluidic components comprise multilayered components;
- code for placing a second component of said plurality of microfluidic components on said template; and

code for connecting said first component to said second component~~The computer program product of claim 76~~

wherein [[a]]the microfluidic component of said microfluidic components comprises a data structure having channel depth information.

Claims 78-80. (canceled)
